MIST SOW TASK 130
Title: Thermal coatings Engineering Non-Flight Support

Statement of Work

Item	Description	Applicable Contract Function
1	**Research, Development and Qualification of Thermal Control Coatings**	**Implementation Phase Services – Mechanical Systems Disciplines**

Performance Requirements	Delivery Schedule:
Submit test reports, samples, formulations, findings, and associated documentation within thirty (30) days after completion of each research and development activity.	30 Day(s)
Conduct research and development of thermal control coatings in the areas of paint formulation, thermal radiative property tailoring of thin film depositon coatings, and coating to substrate application techniques, utilizing the GSFC on-site coatings facilities and laboratories. Investigate new thermal control coatings that are commercially available to evaluate its flight worthiness for space application. Governing GSFC ISO documents: Guidelines for Selection, Application, Characterization and Testing of Thermal Coatings (546-PG-8700.2.1) and Requirements for Thermal Design, Analysis, and Development (545-PG-8700.2.1A). Increase support for laboratory development of molecular adsorber and lotus effect coatings and their derivatives. Increase support for field development of lotus effect coatings at onsite and offsite locations. Support development and qualifications of silicate coated adhesive tapes. Support development of alternative colored silicate coatings and alternative low outgassing non-silicate coatings including primers for GSE and space flight hardware. Support development of methods and procedures to reduce contamination effects of thermal coatings.	12 Month(s)
Conduct research to enable thermal control coating compliance with strategic planetary protection or contamination control requirements. Evaluate new coatings designs and formulations to address spore and bacterial contamination risks.	12 Month(s)

Item	Description	Applicable Contract Function
2	**Thermal Coatings Selection, Review, and Recommendation**	**Implementation Phase Services – Mechanical Systems Disciplines**

Performance Requirements	Delivery Schedule:
Review, select and recommend thermal control coatings and materials for space application to address project needs. Provide support to and participate in meetings of the GSFC Coatings Committee, as needed. Assist with the determination of beginning-of-life (BOL) and end-of-life (EOL) thermal radiative property predictions of thermal control coatings and surfaces based on specified mission parameters, laboratory testing and space flight data. Participate in discipline (thermal, contamination, and mechanical) peer reviews, as needed.	12 Month(s)

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3	**Coatings Application and Manufacturing**	**Implementation Phase Services – Mechanical Systems Disciplines**

Performance Requirements	Delivery Schedule:
Perform coatings application and thin film deposition in GSFC on-site coatings facilities, utilizing GSFC coatings thermal vacuum systems and spray booths. Apply thermal control coatings (paints, epoxies and tapes) to sample coupons, components, instruments, and spacecraft substrate surfaces for characterization and environmental testing. Perform thin film deposition of thermal control coatings to sample coupons, components, instruments, and spacecraft substrate surfaces for characterization and environmental testing. Perform general maintenance to and upkeep of the GSFC on-site thermal control coatings application and thin film deposition equipment and facilities (vacuum chambers, spray guns, spray booth, etc.). Fabricate and manufacture items as needed in support of above effort or per TM direction. Support all coatings related efforts noted above for development and test items for various projects and proposals including lotus coating development, next generation conductive white coatings, photo-voltaic coatings, material qualification, molecular adsorber qualification, silicate coated tape qualification, etc.	12 Month(s)
Governing GSFC ISO work instruction documents: 546-WI-8072.1.62 -- Procedure for Application of Aeroglaze Z306 and Aeroglaze A276 Thermal Control Coatings 546-WI-8072.1.63 -- Procedure for Application of Aeroglaze Z307 Coatings 546-WI-8072.1.64 -- Procedure for Application of Electrodag Coatings to Electric Field Sensors for Use on Sounding Rockets 546-WI-8072.1.65 -- Procedure for Formulation/Application of Glass Balloon Filled Low Specularity Black Paint 546-WI-8072.1.66 -- Procedure for Formulation/Application to Aluminum, of NSB69E and NSB69-82 Thermal Control Coatings 546-WI-8072.1.67 -- Procedure for Application and Maintenance Metallized Teflon Tape With/Without ITO Topcoat 546-WI-8072.1.68 -- Procedure for Formulation/Application of MSA94B Black Thermal Control Coating 546-WI-8072.1.70 -- Formulation/Application of Silicate Based Electrically Conductive Thermal Control Coating 546-WI-8072.1.71 -- Procedure for Specification/Application Of Z-93P and AZ93 Thermal Control	12 Month(s)

Coating 546-WI-8072.1.72 -- Procedure for Application of 3M 425 Aluminum Foil Tape for Space Flight Use 546-WI-8072.1.73 -- Procedure for Application of S13GP/LO-1 Thermal Control Coating 546- WI-8072.1.74 -- Procedure for Application of Transfer Adhesives for Tape Fabrication and Heater Attachments 546-WI-8072.1.76 -- Procedure for Deposition of Aluminum Composite Thin Film Thermal 546-WI-8072.1.77 -- Procedure for Deposition of Dark Mirror Thin Film Thermal Control Coatings 546- WI-8072.1.78 -- Procedure for Deposition of Silver Composite Thin Film Thermal Control Coatings 546- WI-8072.1.79 -- Procedure for Deposition of Single Layer Thin Film Thermal Control Coatings; 546-WI- 8072.0.1--Procedure for Specification/Application of Electrically Dissipative White Silicate Thermal Control Coating; 546-WI-8072.0.2--Procedure for Application of Epoxy Based Primers for Silicate Coatings	

Item	Description	Applicable Contract Function
4	**Thermal-Optical/Radiative Property Characterization of Thermal Control Coatings and Materials**	**Implementation Phase Services – Mechanical Systems Disciplines**

Performance Requirements	Delivery Schedule:
Perform thermal-optical/radiative property measurements of thermal control coatings and materials for space application, utilizing the GSFC on-site coatings facilities and laboratories or using portable equipment for offsite evaluation. Perform measurements in accordance with GSFC ISO document 546-WI-8072.1.61, entitled "Absorptance, Emittance, Reflectance, and Transmittance Measurement of Thermal Control Coatings". Perform calorimetric emittance measurements as required. Perform BRDF measurements or other optical measurements as required.	12 Month(s)
Generate and submit thermal-optical/radiative property test report within seven (7) days after completion of measurements or set of measurements.	7 Day(s)

Item	Description	Applicable Contract Function
5	**Space Environmental Testing of Thermal Coatings and Materials**	**Implementation Phase Services – Mechanical Systems Disciplines**

Performance Requirements	Delivery Schedule:

Perform space environmental testing of thermal control coatings and material to determine its flight worthiness for space application, utilizing the GSFC on-site coatings facilities and laboratories. Governing GSFC ISO documents: Guidelines for Selection, Application, Characterization and Testing of Thermal Coatings (546-PG-8700.2.1) and Requirements for Thermal Design, Analysis, and Development (545-PG- 8700.2.1A). Testing may include but is not limited to, vacuum exposure, ESD evaluations, vacuum resistivity, thermal cycling, UV radiation, solar wind, high energy radiation from various sources, humidity, mechanical tear and tensile strength property, and adhesive strength property evaluations or any other material or space environmental compatibility evaluation as directed by the technical monitor. Perform training as necessary to insure proper safety and environmental exposures. Prepare and manufacture all necessary ground support equipment to support such evaluations.	12 Month(s)
Generate and submit space environmental test report within two (2) weeks after completion of the test.	2 Week(s)

Item	Description	Applicable Contract Function
6	**Coatings Meetings Support**	**Implementation Phase Services – Mechanical Systems Disciplines**

Performance Requirements	Delivery Schedule:
Attend and participate in coatings staff meetings. Provide verbal status reports of coatings activities performed during the specified month. Describe any problems, issues, or concerns requiring further attention. Attend and participate in coatings research and development meetings	12 Month(s)

Item	Description	Applicable Contract Function
7	**Wiper and Swab Extraction and Evaluation**	**Implementation Phase Services – Mechanical Systems Disciplines**

Performance Requirements	Delivery Schedule:
Soxhlet extraction of wipers, swabs and other cleaning materials for use by Code 546 personnel or others for both onsite and offsite locations. Performing all related testing and activities for verification and qualification of extracted materials including non volatile residue, particle and fiber generation, purification of solvents, image analysis, etc.	12 Month(s)

Item	Description	Applicable Contract Function
8	**Planetary Protection Evaluations**	**Implementation Phase Services – Mechanical Systems Disciplines**

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Performance Requirements	Delivery Schedule:
Perform all necessary analysis, evaluations, and surveys for planetary protection items and development for thermal coatings and materials/systems as directed by the TM	12 Month(s)

Item	Description	Applicable Contract Function
9	**Travel**	**Implementation Phase Services – Mechanical Systems Disciplines**

Performance Requirements	Delivery Schedule:
Travel to other NASA centers, test locations and vendor locations to address thermal coatings activities and/or issues, as needed and directed by TM.	12 Month(s)

Item	Description	Applicable Contract Function
10	**Procurements**	**Implementation Phase Services – Mechanical Systems Disciplines**

Performance Requirements	Delivery Schedule:
Procure laboratory equipment and materials for the thermal coatings laboratory and coatings development laboratory or other areas as directed by TM. Procure equipment and materials to support on and offsite testing of coatings as directed by TM	12 Month(s)